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THE
UNIVERSAL SYSTEM:

OR
MECHANICAL CAUSE
OF ALL THE
APPEARANCES and MOVEMENTS of the
VISIBLE HEAVENS:

SHEWING
The true POWERS which move the EARTH and
PLANETS in their central and annual Rotations.

WITH
A DISSERTATION ON COMETS,
The Nature, Cause, Matter, and Use of their Tails,
and the Reasons of their long Trajectories:

LIKEWISE
An ATTEMPT to prove what it is that
moves the SUN round its Axis.

Lacy (J.)
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P R E F A C E.

TH E Marquis de Argens says the Astronomers in France are running as mad after Vortices, as they are in England and Holland after Gravity, and that the Cartesians and Newtonians can much easier oppose their Adversaries' schemes, than prove their own, the former saying that the Gravity of Bodies will in time stop their Course by lessening their Orbits till they come in contact with and imping the Sun, notwithstanding the Motion which was given them at the Beginning, if there is no continual impelling Force to oppose that of Gravity; and the latter in their turn say, that Vortices in which the Bodies are pretended to swim must in Time stop their Courses by the Opposition which

those Bodies make to them by their Weight.

The Writer, therefore, of these Sheets, having considered these Oppositions, and finding them of undeniable Force, thought there might be a third Scheme hit on, which might not be liable to those Objections, and therefore began to make Experiments, and at last found that a globulous Body swiftly turning round and projecting a Fluid, threw it in transverse Lines from the Circumference ; this immediately opened to his Ideas, that the mechanical Cause of the Movement of all the Bodies within the solar System, is occasioned by the Sun's moving swiftly round his Axis, and thereby projecting the Rays of heavy liquid Light on them in transverse Lines, driving them round his Body as the sole Centre, and

and under the Almighty Being, the Cause of all our visible System; and here the Cartesians may find their Vortices moving without Obstruction, being reduced into one grand perpetual moving Vortex, and the Newtonians may perceive their Gravity steadily performing its Office without Incumbrance or Molestation; likewise the Hutchin-sonians may defend their Cherebim or universal Fluid as a Reality passing and repassing throughout the Universe. But after all, the Writer is not so dogmatical as to assert that all his Propositions are infallible, or that they are to be received as such, he allowing that nothing ought to be admitted as Truth, but what will bear the most rigid Enquiry. He had no Design of publishing these Things as from himself at first, but happening to
send

send it (all but that about the Cause of the Sun's central Rotation) in the Year 1755 to Monsieur Grand Jean de Fouchy, the then Secretary to the Royal Academy of Sciences at Paris, and afterward to the Gentleman's Magazine, and neither of these taking any Notice of it, and not knowing (by what he could learn) whether it had ever seen the Light, he was willing to venture it to the Press, in order to stand the Test of the publick Judgment, either to be rejected or approved. And if it tends to advance the Glory of the Divine Being in the Mind of the Reader he shall gain his chief End.

JOHN LACY.

T H E

UNIVERSAL SYSTEM:

O R

MECHANICAL CAUSE

OF ALL THE

APPEARANCES and MOVEMENTS of the
VISIBLE HEAVENS, &c.

IN order to come to the main Question, let us consider a few Propositions to be received as Axioms, which will serve to shorten the Work.

. First then; All Bodies gain a velocity by their weigh or swing: that is to say, when they begin their Motion, it is slower than when they have passed some Distance; as for Example, a Ship with her Sails set, moves

B swifter

swifter after she has gained her weigh or
fwing, than at her first beginning to
move, though the Sails and Wind be the
same.

2. The Power of Projection increases
and decreases faster than the Power of
Gravity, with regard to Bodies which ap-
proach toward, and remove from, the Sun.
This is allowed by the best Philosophers.

3. That the Matter of Light is an ex-
tremely heavy Body; because it flies from
the remotest Telescopic Stars to us, with-
out which we could not see them.

4. That the Matter of Light or Fire,
when in Direction, is in a fluid Form.

5. That the Body of the Sun is the
Cause of the Projection of Light.

6. That the Power of Gravity acts in
a right Line from the Center of the Sun,
to the Center of the Earth: although all
Parts of the Sun and Earth draw each
other, yet the Attraction of the Sun is
more

more forcible at the Point of the Surface of the Earth next his Body, than at any other Part.

7. That the Power of Gravity in Bodies towards each other, is more or less according to the Quantity of Matter or Nearness.

8. That it is the Nature of the Particles of Light and of Air to adhere to, and mix with each other. This is seen in hot Countries, where the Valleys having a thick dense Air, contain the Particles of Light or Fire, making it extremely hot, while the adjacent Mountains are covered with Snow: because the Air there, being extremely thin and rare, the Particles of Light or Fire refract, and fly away in greater quantities than in the Valleys, there not being Air enough to contain them: thus, according to Boerhaave, the Air is full of Light or Fire according to its Quantity.

And now let us consider, first, what it is that moves the Earth round the Sun. And this, I apprehend, is performed by

the Projection of Light, assisted by the Power of Gravity: for the Matter of Light being extremely ponderous (according to the third Axiom) such a prodigious Quantity as falls on above half the Surface of the Earth continually, must needs have a great Operation to repel the Earth to a great Distance from the Sun, even sufficient to balance the Power of Gravity, which acts with the greatest Force in the nearest Parts of the Earth and Sun, in a right Line betwixt the Center of the Sun and the Center of the Earth (according to the 6th Axiom;) and prevents the latter from flying off to too great a Distance from the Sun. And thus, the Earth is held fast in a just Balance betwixt the Powers of Light and Gravity. But, if the Projection of Light were to be in right Lines from the Center of the Sun equal in Quantity on each side of the Line of Gravity, the Earth would be perpetually suspended, and could not perform either her diurnal or annual Motions. But, this is not the Case, for the Sun, moving continually with a rapid Motion round his Center, projects his

Rays

Rays of Light in tranſverſe Lines from his Circumference, which cauſes a greater Quantity of Rays to fall on one Side of the Line of Gravity, than on the other. Which to prove and illuſtrate, ſet a Top in Motion, and pour Water on it, it will project the Water in tranſverſe Lines, flying before the Rotation: it may likewiſe be ſeen in the twirling of a wet Mop. And thus the Sun by a rapid Rotation round his Center, projects the Matter of Light in a fluid Form in tranſverſe Lines on the Earth, and all the ſuperior Planets and Comets within the ſolar System, which is the Cauſe of all their Motions. But it will be extremely difficult, if not impracticable, to form a Machine to illuſtrate the Earth's Motion on this Suppoſition. For, if we place a Ball of Wood on a Spindle within the Projection of the Globe, the Water will preſs violently on the Ball, but give it no Rotation: The Reaſon is, the reſiſtance of the Ball is lodged in an equal Force on each Side of it's Center, and the Water, ſtriking in equal Quantities on each Side of it's Center, keeps it in a State of Reſt.

But

But it is not so with the Sun and Earth, for there being a greater Power of the Earth's Gravity, resisting the Projection at the Surface next the Sun, and gradually diminishing to the opposite Surface (according to the 6th Axiom) and the middle Line of Projection, making a considerable Angle with the Line of Gravity the diurnal and annual Motions are performed. See Plate 1, where let S be the Sun projecting his Rays in transverse Lines. It appears that the Spots in the Sun when next to us, move from the East Limb to the West Limb, consequently, the upper Surface of the Sun from us, must move from West to East, which is the same Motion with the Earth in her diurnal Rotation: the Sun moving from X to Y. The greatest Resistance of the Earth's Gravity being placed at B and the lesser at E (according to the 6th Axiom) the Force of the Rays of Projection being every where equal on each Side of the Center of the Earth, but more in Number on the East Side of the Line of Gravity than on the West, the Earth gives Way at E and moves round in her diurnal Rotation,

from

from E to D, but the Rays on the East Side of the Line of Gravity would encrease the velocity too much were there nothing to resist it; therefore, the Rays which fall on the West Side of the Line of Gravity betwixt B and D perform the same Office as the Pendulum of a Clock: that is, to regulate the diurnal Motion in a due Equality. The same Law of Gravity, and the Projection of Light, perform the annual Motion: for were there no Projection of Light, the constant Power of Gravity would attract the Earth immediately to the Sun, till they came into Contact: and were there no Gravity, the whole Power of the Rays which fall betwixt C and D would impel the Earth to move from E to H, and never to return. But the Earth having an Attraction equal to its Projection by the Sun, and there being more Force on the East Side of the Line of Gravity, than on the West Side, it causes the Earth to describe a Curve in her annual Motion, and to roll from E to K. And thus the Earth performs mechanically, its diurnal and annual Motions.

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The mechanical Cause of the Earth's North and South Declination, arises from the aforesaid System of the Sun's projecting the Matter of Light in transverse Lines on the Surface of the Earth. But the Sun being a globular Body, the Rays of Light on each Side of his Equator, diverge in Projection, and grow still weaker as they are projected from those Parts near his Poles: and those Rays which are projected nearest those Poles incline to fly in Lines parallel, because the Rotation there is not so violent and large as at the Equator; which is the mechanical Cause of the Earth's moving in her North and South Declination, see Fig. 2. where let G be the Sun, E the Earth, the Line, M L drawn through the Poles of the Sun, the Line S N drawn through the Poles of the Earth. Let S be the Place of the Earth at her utmost Point of South Declination, and N be the Place of her utmost Point of North Declination, where the Sun projecting his Rays in transverse Lines, and those Lines diverging on each Side of his Equator, they operate on the Earth: as, suppose the

Earth

Earth at the utmost point of North Declination, the Force of Gravity there overpowering the Force of Projection, by the 2d Axiom, inclines the Earth to move to the Center of the Sun; but being kept off by the projected Rays, and gaining a velocity by her weigh or swing, by the 1st Axiom, her Equator passes the Equator of the Sun, where the diverging Rays strike her on the North Side of her Equator, and force her to the utmost Point of South Declination, from whence she returns by the same Laws.

In the next Place, I apprehend this Theory will easily account for the Earth's Aphelion, and Perihelion; by Means of her Atmosphere: for if the Earth had no Atmosphere, she would always move in her mean Distance from the Sun, there being nothing to add to her velocity, or diminish from it. And to illustrate this, let three Bullets of Lead of equal Size be hung seperately, at the Ends of three Pendulums, of equal Length: let one of the Bullets be wrapped about with thick Wool, and one with thin Wool, let the

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other

other be naked; give them each an equal blast of Wind, with a pair of Bellows; and that with the thick Wool, will vibrate further than that with the thin Wool, and this further than the naked Bullet; which shews what superior Power a subtile Matter hath in Projection on a Body, with an Atmosphere. Again, let the Bullets with the Wool, have it extended loosely, so as to hang in the Form of a Tail, and give a Blast equal to the former, and they will move further and much quicker, than when the Wool was wrapped close to them, which proves that the more an Atmosphere is extended, the more it receives of the Matter of Projection. Thus the Earth in her Perihelion, having a Quantity of her Air driven off to a Distance, by the Rays of the Sun, and the Particles of Light adhering thereto, a Tail is formed similar to that of a Comet, and resisting the Power of Projection, it moves her away from the Sun, to her Aphelion, from whence she returns by the same Laws as a Comet, as shall be described hereafter. And here is it not to be suspected, that the Galaxy, or Milky Way, is no other than the proper Tail of the

the Earth. And that this Suspicion is not altogether improbable, appears from the following Reasons, viz.

1st. The Galaxy is of the Colour of a Comet's Tail when it begins to extend: that is of a perfect White, which is allowed by all, to be the proper Colour of Light.

2. Those Telescopic Stars (as they are called) which are generally supposed to form the Galaxy, have been observed,* to change their Places; at other Times to grow faint, and wholly vanish, and sometimes to increase, so as to be seen by the naked Eye, which seems to prove them moveable Meteors, and Bodies unlike the fixed Stars, in other Parts of the Heavens.

3. The Galaxy grows dim and faint, about the latter End of March, when the Earth approaches towards her Aphelion, and before it is overtaken by the Evening Twilight.

* See Derham's Astro-theology.

4. The Galaxy appears most dense and bright, when the Earth is in her Perihelion, at the latter End of December.

5. The Chasms in the Galaxy, seem farther to correspond with the Notion of its being the Atmosphere of the Earth; in which there must be similar Chasms, arising from the alternate Surface of Sea and Land: the Vapours which constitute the Atmosphere, being thicker off the Sea, than off the Land.

However, what is here offered, is not asserted dogmatically, but to be considered as a probable Conjecture: for as the Earth must have somewhere such a Tail, which increases in her approach towards the Sun, and diminishes in Proportion, as she recedes from him; so these Reasons may incline one to suspect, that the Galaxy may be that Tail.

And is not this the Cause of the Earth's Aphelion and Perihelion? And as she is allowed to be upwards of two Millions of English Miles further from the Sun, on the 30th of June, than on
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the 30th of December, must it not arise from the same Cause of Gravity, and the Projection of the Particles of Light, by filling the Atmosphere with their Weight, in her Perihelion, and thereby driving her away to her Aphelion, where those Particles being cooled and coagulated, they drop down on her Surface, to make her fertile, perhaps, or for some other unknown Uses.

That perceptible Inequality of the Earth's Motion, namely the slow Motion of the Equinoctial Points in Antecedentia, or from East to West, I apprehend arises from the above-mentioned Laws, of the Powers of Gravity and Projection of Light. For the Earth, when she hath passed her Perihelion Point, is under the Power of a greater Projection, than when she is returning from her Aphelion: consequently, she describes a greater Curve in the first, than in the last. Which to illustrate, let the aforefaid naked Bullet be suspended at the End of a Line; let it be projected, from the Point of Rest upward in a Curve, by the Hand, and it will return

by the Power of Gravity in a strait Line: and thus it is with the Earth, passing from her Perihelion, when she describes a greater Curve, and in her return from her Aphelion to the Sun, she moves in a straiter Line by the Power of Gravity, and thus the Equinoctial Points, gain a small Matter every Revolution, which is well known to be a Degree in 72 Years: so that in 25,980 Years the whole Helio-centric Ecliptic, will move totally round the twelve Signs of the Zodiac.

The mechanical Cause of the Planets different Distances from the Sun arises from their different Degrees of Density and Rareness, as well as from their Bulk. Thus Mercury is allowed to be more Dense than Saturn, which is known to be of much greater Bulk than the former; wherefore the Rays of Light have greater Power in Projection to drive him (to wit Saturn from the Sun, till that Power is so far diminished, as to be but an equal Balance to that of Gravity, and there fixing his Station, he performs his Revolutions, by the Laws aforesaid. And on the other Hand, Mercury being more dense and compact,

compact, is attracted nearer the Sun, by the Power of Gravity operating on the Quantity of his Matter; and his Surface being less, the Rays of Light have not so great a Power on him, as on the Surface of Saturn: So that he descends toward the Sun by the Power of Gravity, 'till he feel the violent Projection of the Rays of Light, sufficient to balance the Power of Gravity, and there fixing his Station, he performs his Revolutions, as was said above of Saturn. Perhaps there may be as much reality of Matter in Mercury, as in Saturn, but the Difference of Bulk, Density, and Rareness, makes the Difference of their Distances from the Sun. Wherefore, if all the Planets were to be collected to the Place of the Earth, the Inferiors, as Mercury and Venus, would immediately descend towards the Sun, to their present Places, and there continue: and the Superiors, as Mars, Jupiter, and Saturn, would recede from the Sun, to their present Stations, by the Laws aforesaid.

The Moon is chiefly governed by the Earth, because of her nearness; by Reason

son of which, the Gravity of the Earth, and her reflection of the Rays of Light, which she receives from the Sun, move the Moon round the Earth in her monthly Orbit, in the same Manner as the Gravity and Projection of the Sun move the Earth round his Body in her annual Orbit, as aforesaid.

Dr. Derham says, that the Sun would appear to a Spectator, at Saturn, but very little bigger than the Planet Venus does to us; because Saturn is removed 100 Times further from the Sun than our Earth: But I take this to be a Mistake; for the diminishing of the Appearance of a Body, removing from the Eye, lessens continually: and the further it removes, the less is its apparent diminishing: as suppose, the mean Diameter of the Sun to be, with us 32 Minutes; a Spectator at Mars, would see but very little diminishing of his Diameter, and still less at Jupiter, although at so great a Distance; but at Venus the Increase would advance; still more at Mercury, because of his Nearness to the Sun. From whence we may gather, that the Sun's Diameter at Saturn, is

is not so small, as his Distance might lead one to conclude; but appears, perhaps, equal to half (if not more) of the Apparent Diameter here.

Of the COMETS.

The Doctrine of Comets is very abstruse for Want of Observations, because of their long Absence: therefore, we must be very cautious in our reasoning about them; but we may be allowed to judge of them from what we see. And first, with regard to their long Trajectories, which I apprehend arise from the Nature of their Atmosphere, for they having a very thick and dense Air, (and allowing the Matter of Light to be the impelling Cause of the Projection of Bodies) must needs describe such long Ellipses, as we see them move in. For their Atmosphere being filled (See Plate 3, where let S be the Sun, A the Comet) with Light, performs the same Office to the Body of the Comet, as a Sail does to a Vessel in the Water; the larger the Sail is, the swifter the Motion, and when it is dry and porous, it does not resist the Power of the Wind, as when it is

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wet and heavy, for then the Pores being stopped, it impels the Body of the Vessel, and gives it the greater Velocity. And in the same Manner we are to conceive of a Comet, in its Approach to, and Recess from the Sun. Let us suppose such a Body advancing from its Aphelion towards its Perihelion, by the Power of Gravity, and at its first setting out, aiming (as it were) directly at the Center of the Sun, and the nearer it approaches to the Sun, the Power of Gravity increases: but on the other Hand, the Power of the Projection of Light, increasing faster than that of Gravity, (by the 2d Axiom) he is resisted powerfully, lest he should come into Contact with the Sun, and the transverse Lines of Projection, move him round the Body of the Sun, and fill his thick Atmosphere with the Particles of Light, (according to the 7th Axiom) which being made extremely thick and ponderous with the same, according to the third Axiom, when the Body of the Comet arrives at his Perihelion Point, where the Power of Gravity is overcome by the Power of Projection, which then moves him round the Sun, and returns him

him again towards his Aphelion. And here it may be noted, that the Comet in its Approach to the Sun, is held off considerably by its Tail, from impinging on the Sun: for the Rays of Projection would not otherwise be able to ward off its Body from the Sun, were it not that its Atmosphere is driven off, and filled with Light, and thereby rendered heavy: And this may be one great Use of its Tail. And in its Return to his Aphelion, the Particles of Light (which according to Mess. Homberg and Boerhaave, are no other than a subtile Sulphur, when condensed by Coldness,) having lost their Direction, and consequently their fluid Form, (by the 4th Axiom) begin to disengage themselves from the Particles of the Comet's Air, and are dispersed in the Universal Space: or with more Reason it may be conjectured, that they descend by Gravity on the Comet's Body, to make it fertile, or for some other unknown Uses. And the Comet by Virtue of the violent Projection, which was given him in the Neighbourhood of the Sun, having gained his Weigh or Swing, according to the 1st Axiom, moves on till he arrives at his

Aphelion Point, where he spends a long Time, till at length the Force of Gravity having overcome the Power of Projection, by gentle Degrees he returns again by the same Laws; only it is to be noted, that the Comet moving to his Aphelion, the Motion is slower and slower, 'till at that Point he hardly moves, which causes his long Absence.

If it is objected, that the Comets sometimes move different from the Planes of the Planets; it may be answered. This is in Appearance only, for the Comets must needs have great Declinations, both North and South, and when the Earth hath great North Declination, and the Comet in approaching to, or departing from the Sun, hath great South Declination, he will appear to be moving direct South; and *vice versâ*. But on due Observation, it will be found, that a Comet never crosses the Poles of the Sun, nor yet moves contrary to the Motions of the Planets, with regard to the Sun.

But a Question may arise; of what Use are Comets to the Creation? to which it may

may be answered; Perhaps, for the same Use as the other Bodies of the Universe; for the Comfort and Entertainment of intelligent Beings. It is a general Notion, that Comets are sometimes inconceivably hot in their Perihelion, and again very cold in their Aphelion. But I apprehend there is not so much Difference here, as is generally thought, for the Reasons following. It is certain that the chief Cause of Heat arises from the Thickness of the Air, and its being mixed with the Particles of Fire. This is evident in the high Mountains, in hot Countries, the Tops of which are covered with Snow, while the Vallies below are parched with Heat: the Reason of which is, that the Tops of the Mountains being destitute of Air thick enough to retain the Particles of Light, those Particles refract, and fly away without being felt; or at least not felt so hot, as they are in the Valleys, where the Air is so much thicker.

And thus a Comet in its Approach towards the Sun, having its Air driven off to a great Distance, its Body is left naked, whereby the Particles of Light refract,
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and fly off, and thereby an intense Heat is prevented, from fixing on its Surface. Were that dense Atmosphere to be retained when near the Sun, which adheres to its Body, at other Times, when the Comet is at a great Distance from the Sun, no doubt but it would heat the Comet, perhaps as much as is generally imagined. It is supposed by some Philosophers, that a Comet may approach near enough to the Sun, not to be cold again in 50,000 Years. But this is too great a Violation of the Laws of Nature, for by its returning again, if it is but once in 500 Years, it would in a few Revolutions be vitrified, and at last dissipated and lost. But by its thick Air being removed from its Body, when near the Sun, and again returned by the Comet's Gravity, when at a Distance from the Sun, by which it retains the Particles of Light, which it then receives from the Sun, its Body continues in a due Temperament of Heat and Cold, and wherein, there is very little, if any Difference, either in its Perihelion or Aphelion.

And as it is believed, that the Planets
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are inhabited like our Earth; why may not the Comets be the same? But if so, how can the Inhabitants bear the Extremes of Heat and Cold, Light and Darkness, to which they must be liable, in the Extremes of the Comet's Nearness to, or Distance from the Sun? As to its Heat or Coldness, it is shewn above, that there is not so much Difference, but it may be borne without Trouble, and perhaps with Pleasure, like Summer and Winter here. And as to Light and Darkness, we shall endeavour to prove, that there is not such a Difference in these Circumstances, as may not be admitted with Comfort. Indeed one might think, if we were to be so near to the Sun, as a Comet is sometimes, when it is in its Perihelion, the Sun would appear of a frightful Magnitude, and on the other Hand, at the Comet's Aphelion, the Sun would be hardly seen; or so much diminished, as to give but very little Light. But both these Suppositions will vanish, if we consider that it is the Quantity of Air which magnifies, or diminishes the Appearance of the Bulk of the Sun: for Example, when the Sun rises in the Horizon, from
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the Ocean, in a clear frosty Morning, when the Air is very dense, thick, and ponderous, his Diameter appears at least four Times as large as it is in its Meridian, in the midst of Summer, when it shines through a thin and rare Medium. The Reason is, that the Air mixes with, and expands the Rays of the Sun before they reach our Eye, and thereby enlarges the Appearance of the Sun's Bulk extremely. And with regard to a Comet, it is the same. For when the Comet is in its Perihelion, the thick Atmosphere being driven off to a great Distance, the Rays of the Sun have no Lodgement on its Surface, but refract and fly off. Consequently, the Face of the Sun appears but little larger, (if any) than when the Comet is in its Aphelion, only of a much whiter Colour; and on the other Hand, when the Comet is in its Aphelion, the Sun appears of a red Colour, as in a frosty Morning at his rising, and perhaps of as large Bulk as in his Perihelion.

Thus we have given Reasons why Comets are neither hotter nor colder, lighter nor darker (or but little more) at one
Time,

Time, than at another. See Plate 4, where let S be the Sun, C the Comet.

We may now enquire the Reason of their long Absence from, and short Presence with the Sun. It is because there are so many of them, that there would not be Room for them to move in regular Orbits round the Sun, as the Planets do, without disturbing each other too much. Therefore there is a Necessity for their removing to remote Regions, for their own Conveniency. And here we may make the following Corollary, viz. Hence there seems Reason to believe, that Comets are not made for Recruits for the Sun, nor for Places of Torment, with Heat and Cold, but are comfortable Habitations, suited to the Nature of the Inhabitants, if any such there be. And in their Voyages to the Sun, they fetch a Cargo of that noble Sulphur, which adheres to their Tails, and which is the Spring of Life in all visible Beings, and when their Stock is spent in their Aphelion, they return again for more Supply.

Some apprehend the Earth and Planets

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are in Danger, from the too near Approach of one or other of the Comets, in their Access to, or Recess from the Sun, either by burning or drowning them, or forcing them out of their Natural Courses. But this Apprehension seems to be needless, if we consider that the Comets by their long Trajectories, must needs have very great Declinations North and South; and that tho' they move in the Planes of the Planets with regard to the Sun, yet they may perform their Revolutions round the Sun, and escape the Orbits of all the Planets. The Planet Mercury seems to be in the greatest Danger, by being nearest the Sun, but there is Room enough betwixt Mercury and the Sun, for a Comet to pass to, or from his North or South Declination, without disturbing that Planet at all, or not materially; and consequently, the Earth and the superior Planets are in no Danger. And notwithstanding what Dr. Halley says about the Comet of 1680, being but one Semidiameter Northward of the Earth's Orbit, on the 11th of November, this might arise from the Comet's approaching the Sun from its North Declination,

nation, and being almost in a right Line with the Earth's Orbit and the Doctor's Eye, might appear near it, tho' at the same Time, at a great Distance beyond the said Orbit.

*Of the MECHANICAL CAUSE of the SUN'S
ROTATION ROUND HIS AXIS.*

We proceed now to enquire into the true Mechanical Cause of the Sun's central Rotation round his Axis. And this I conceive is performed by that fluid Matter, which is disperfed through the Universe, as we fhall prove hereafter. And that there is fuch a fluid Matter, Sir Ifaac Newton suspected, for he fays, (fpeaking of a fubtile Medium, left in the fmall Vacuum of an exhausted Receiver) "Is not this exterior Heat conveyed thro' the Vacuum, by the Vibrations of a certain Medium, far more fubtile than Air, which Medium after the Air was drawn out, remained yet in the Receiver?" And afterwards fays, "Does not this Medium readily pervade all Bodies, and is it not by its elastic

" Force expanded through the whole
 " Heavens?" Optics. Page 323, 324.
 Thus this great Man sufficiently grants,
 that there is such a subtile Matter in the
 Universe: but he thinks it may be more
 rare near the Sun, than at a Distance
 from his Body, but I shall endeavour to
 prove, that it is more dense near, and
 more rare at a Distance from the Sun.
 Now this fluid Matter is no other than
 that subtile Sulphur, which is the Matter
 of Light projected from the Sun and
 fixed Stars, which are so many Suns
 throwing their melted Sulphur through-
 out the Universe, which having lost its
 Force of Projection from its Sun, from
 whence it was dispatched and grown cool
 and stagnating, begins to feel the other
 Power, namely that of Gravity, from that
 Body which has the greatest Power to at-
 tract it, and then makes its nearest Way
 to that Body, and our Sun being of great
 Bulk and Density, attracts Oceans of this
 volatile Sulphur continually, which flow-
 ing from all Parts, and increasing in Velo-
 city the nearer it approaches, strikes the
 Body of the Sun on all Parts violently, by
 Virtue of its Weigh or Swing (by the
 1st.

1st Axiom) and its Gravitation towards the Sun: But as in its Journey, it meets the transverse Rays of the Sun, which are projected from his Body, these Rays refract, and turn the advancing Matter, the contrary Way, making them describe a curvous transverse Line, cutting the Lines of Projection, and the nearer they approach the Body of the Sun, the greater the transverse Curve, and the greatest at his Equator, by the Violence of the Projection, and the thicker they meet with the projected Particles, 'till at last impinging the Body of the Sun, force him round his Axis: and adhering to his Body, and there floating round on the Surface of the Sun, on that Matter which is not melted enough for Projection, and forming themselves into great Mountains, by attracting each other, appear as dark Spots 'till they are melted, so as to be fit again for Projection. But this attracted Matter flying to the Sun from all Quarters, there being little or no Projection of Light in transverse Lines, at the Poles of the Sun, the Particles of attracted Matter strike the Sun at his Poles in right Lines, paral-

lel with his two Poles, and by Virtue of the converging Rays of Projection, they diverge, and form a great Quantity of dense Matter at the Poles of the Sun, and serve in the Nature of a Spindle, for the Sun to spin upon in his central Rotation.

And thus this ponderous subtile Sulphur which is the Matter of Light, by being melted and projected by the Sun, diverging in its Flight, and at last stagnating, and then gravitating towards ours, or some other Sun, converging and coagulating in its Return, and striking the Luminary in transverse Lines, contrary to those of Projection, thereby moving him round in his central Rotation, performs all the Phænomena of the Universe. See Plate 5.

COROLLARY I.

By this it appears, that there is no such Thing as a real Vacuum, or not such a one as is totally void of all Matter: neither such a Plenum, but there is Room for the Particles of Light to pass and repass throughout

throughout all the Universe, and perform their Offices in carrying on the Business of Nature.

COROLLARY II.

And from hence we may perceive, that there is a Communication throughout all the Creation, by Means of this Matter of Light, which by being melted, projected, stagnated, cooled and attracted, keeps up a perpetual Correspondence betwixt all the Bodies in the Universe.

COROLLARY III.

We know not the true Place of any of the fixed Stars, because of the Length of Time it requires, for their Light to pass from their Bodies to us, for if according to Sir Isaac Newton, the Particles of Light are 8 Minutes in passing the Distance from the Sun to us, that Distance being in his Judgment, 81 Millions of English Miles, (which is about 10 Millions of Miles in a Minute of Time) and the nearest of the fixed Stars, supposed to be Sirius, is according to Mr. Huygeus,

27,664

27,664 Times the Distance of the Sun from us, the Flight of Light from Sirius to us, will require upwards of 116 Days for its Journey to our Earth. So that when we behold Sirius, we know not in what Place his real Body is posited. And so we may conceive of the other fix'd Stars, but the Distance of the remotest, which we can see by our receiving their Light, is beyond the Comprehension of any Mortal.

COROLLARY IV.

Hence we may account for that confused Order, in which the fixed Stars appear: for it arises only from the different Times in which their Light arrives from their Bodies to us. For could we but see them in their true Positions, we should perceive the greatest Regularity, Order and Harmony, in their Stations, according to their proper Distances from each other.

COROLLARY V.

From the Whole we may conclude, that Gravity, or Attraction, is the first Law
of

of Nature, and that all other natural Laws depend on it. But what this Gravity is in Reality, was never yet discovered by any Mortal, and perhaps never may. He must be a sublime Philosopher indeed, who shall be able to unfold so hidden a Mystery. That there is such a Thing, is evident every where to the Senses, and all Things depend on it. And should the Almighty suspend its Power, in this our solar System, the whole Apparatus of Sun, Planets, and Comets, would be immediately dissolved, and the sensible Heavens and Earth flee away, and be no more found!

F I N I S.

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